POST RELEASE PERFORMANCE OF NATURAL AND HATCHERY SUBYEARLING FALL CHINOOK SALMON IN THE SNAKE AND CLEARWATER RIVERS

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ABSTRACT

In 2006, we continued a multi-year study to compare smolt-to-adult return rate (SAR) ratios between two groups of Snake River Basin fall Chinook salmon Oncorhynchus tshawytscha that reached the sea through a combination of either (1) transportation and inriver migration or (2) bypass and inriver migration. We captured natural subyearlings rearing along the Snake and Clearwater rivers and implanted them with passive integrated transponder (PIT) tags, but knew in advance that sample sizes of natural fish would not be large enough for precise comparisons of SAR ratios. To increase sample sizes, we also cultured Lyons Ferry Hatchery subyearlings under a surrogate rearing strategy, implanted them with PIT tags, and released them into the Snake and Clearwater rivers to migrate seaward. The surrogate rearing strategy involved slowing growth at Dworshak National Fish Hatchery to match natural subyearlings in size at release as closely as possible, while insuring that all of the surrogate subyearlings were large enough for tagging (i.e., 60-mm fork length). Surrogate subyearlings were released from late May to early July 2006 to coincide with the historical period of peak beach seine catch of natural parr in the Snake and Clearwater rivers. We also PIT tagged a large representative sample of hatchery subyearlings reared under a production rearing strategy and released them into the Snake and Clearwater rivers in 2006 as part of new research on dam passage experiences (i.e., transported from a dam, dam passage via bypass, dam passage via turbine intakes or spillways). The production rearing strategy involved accelerating growth at Lyons Ferry Hatchery, sometimes followed by a few weeks of acclimation at sites along the Snake and Clearwater rivers before release from May to June. Releasing production subyearlings has been suggested as a possible alternative for making inferences on the natural population if surrogate fish were not available. Smolt-to-adult return rates are not reported here, but will be presented in future reports written after workshops and input by federal, state, and tribal researchers. In this report, we compared the postrelease performance of natural subyearlings to the postrelease performance of surrogate and production subyearlings. We made this comparison to help the fisheries community determine which of the two hatchery rearing strategies produced fish that were more similar to natural subyearlings. We compared the following attributes of postrelease performance (1) detection dates at dams, (2) detections during the implementation of summer spill, (3) travel times, (4) migrant sizes, and (5) the joint probability of migration and survival. Overall, we found that postrelease performance was more similar between natural and surrogate subyearlings than between natural and production subyearlings. Further, the similarity between natural and surrogate subyearlings was greater in 2006 than in 2005, partly as the result of changes in incubation and early rearing practices we recommended based on 2005 results.